State of California

Memorandum

To : 1. ~~Bob Ford~~
2. Jim Cornelius
3. Jeff Barnickel

Date : MAR 0 8 1985

From : **STATE WATER RESOURCES CONTROL BOARD**

Subject: MEETING WITH WESTERN OIL AND GAS ASSOCIATION (WOGA) AND EPA REGION 9 ON CLASSIFICATION OF OIL FIELD WASTE STREAMS, FEBRUARY 8, 1985, IN BAKERSFIELD

The meeting was called to discuss the characteristics of three kinds of nonhazardous oil field waste water to determine if they could be treated as "produced water". The three waste waters under discussion are:

1. filter backwash
2. water softener regeneration brine
3. air scrubbing waste

Produced water, according to the EPA regulations, is defined as water brought to the surface in connection with oil and gas production and can be injected into Class II wells which in California are permitted by the California Division of Oil and Gas (CDOG). EPA, Region 9, currently considers the three waste streams under discussion as "industrial" waste. Industrial waste is subject to EPA jurisdiction and to the extensive EPA permitting requirements since such waste can only be injected into a Class I or V well. EPA permits Class I and V wells in California.

Filter Backwash

Filter backwash is formed when produced water is run in a reverse direction through a filter bed. This action cleans the filter bed by removing the trapped solids from the filter. Filter beds made of diatomite or gravel are used to remove suspended solids from produced water. Chemicals may be used to enhance removal of suspended solids by the filter, but the removal mechanism is primarily mechanical. If no chemicals are used, the filter backwash is identical to produced water except for an increase in suspended solids.

For your information, the filtered water is converted to steam and injected into a well for use in "steamflood" enhanced oil recovery operations. The steam heats the thick crude oil, reducing its viscosity and making it easier to pump.

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Water Softener Regeneration Brines

Water softener regeneration brines are created as a by-product of the water softening process. Produced water is softened before its use in steamflood or waterflood enhanced oil recovery projects (waterflood operations have the same purpose as steamflood operations, but use hot water instead of steam). Softening reduces or eliminates deposits such as scale on the inside of well casings, boilers, and other similar equipment. To provide softening, water is flooded across a resin bed where calcium ions in the water are exchanged with sodium ions from the resin bed. When the exchange capacity of the resin bed is reached, the bed is rinsed with a sodium chloride solution to regenerate the resin by replacing the calcium with sodium. The salty rinse water ("regeneration brine") is then usually injected into a disposal well. While the total amount of calcium injected as a result of waste disposal operations is the same as the amount initially present in the produced water (from regeneration brine plus softened produced water), the chloride concentration in the regeneration brine has been increased by the salts added during the regeneration process.

Air Scrubbing Wastes

Air scrubbers remove SO_2 from air emissions. The scrubber waste therefore contains SO_2 as well as numerous other additives. Because of the additives present, this waste is the most different from "produced water". Further details on air scrubber waste were not discussd.

Discussion

After discussing the nature of the three wastes, Pete Uribe of EPA Region 9 said he would consider the information, discuss the issue of codisposal of the wastes with produced water into Class II wells with EPA Washington, and notify WOGA in three weeks. A prompt decision is important because owners of non-Class II wells must file a complete UIC application with EPA by June 25, 1985, and preparation of a complete application takes considerable time. Wells without complete applications by that time must be shut down. Uribe felt, based on the meeting, that filter backwash met the definition of fluids acceptable for a Class II well [see Agenda attachment, page 2, Definition of a Class II Well, Number (1)]. Because of the additives in the other two waste streams, Uribe was doubtful they would meet the regulatory definition.

Many important points were discussed during the meeting:

1. The industry does not dispute the EPA position that wells that inject only these waste streams for disposal should be either Class I or Class V wells. The EPA regulations clearly indicate that wells that inject only these waste streams for enhanced recovery are in Class II. The Class II designation is based on the idea that a company will not knowingly inject inappropriate fluids and ruin an oil-producing zone. The controversy centers on commingling a small amount of the three wastes under discussion (usually less than 5 percent of total volume of injectate) with produced water for disposal. The industry feels that such commingled wastes are indistinguishable from 100 percent produced water. Such wastes do not, however, fit the EPA regulatory definition.

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2. The oil industry is set up to dispose of the three wastes by blending them with produced water. Since industry does not want to comply with permitting requirements for Class I and V wells if the wastes do not qualify for Class II injection, industry practices would need to be revamped to concentrate the wastes into as few wells as possible; these few wells would then be permitted by EPA. Industry personnel argue that it is better to disperse than to concentrate the three wastes of concern, so codisposal is advisable.

3. If the three wastes are not found to be acceptable for Class II injection and if disposal of the wastes is not concentrated into a few wells, hundreds of wells presently considered to be Class II will come under EPA jurisdiction as Class I or V. EPA does not plan to regulate Class V wells at present, but Class I wells must have complete UIC applications by June 25, 1985, as stated above.

4. Industry representatives prefer regulation by CDOG to regulation by EPA because CDOG processes permits faster and "understands" oil field problems. EPA's application process is slower and requires specific information presented according to a specific format. Both regulatory agencies, however, are supposed to provide equivalent protection of water. CDOG believes strongly in selp-policing by industry as an acceptable, time-effective method of regulation.

5. Industry representatives do not like to have regulatory control of neighboring wells divided between two agencies.

6. Produced water, and produced water commingled with waste water, are not always returned to the aquifer from which the produced water was removed. Frequently, the disposal of such water is to shallower aquifers because such shallower wells are cheaper to construct, convert, or maintain.

7. Industry representatives cited regional board pressure to ban percolation ponds as a reason why the amount of underground injection could increase significantly in the next few years.

I was asked what the State Board's role would be in the UIC program. I stated that I was attending the meeting as an observer and was not prepared to speak for the Board. My opinion, I stated, was that we would continue as at present, with the regional boards reviewing the actions of CDOG and EPA, and expressing our concerns as needed. Resources are not available to allow a greater level of involvement at this time. Uribe stated that State Board and EPA staff were exploring the possibility that the State Board would reapply and receive primacy for non-Class II wells.

Other concerns with the EPA program were expressed near the close of the meeting. Bill Brommelsiek of Chevron was concerned that the financial responsibility statement for Class II, III, and V wells is the same as for a

Class I well (i.e. too stringent). Brommelsiek was also concerned that EPA Region 9 presently requires the radius of influence of injectate to be calculated three ways, the three results compared to a 1/4 mile distance, and the most conservative (i.e. largest) of these radii used in project planning. He felt this was overly conservative and that a calculated number less than 1/4 mile should be acceptable.

A meeting with the same attendees is planned for early March to discuss the EPA verdict on the three wastes.

Charlene Herbst

Charlene Herbst
Associate Engineering Geologist
Hydrogeology Section

Attachments

cc: Bill Pfister, Central Valley Regional Board
Eric Gobler, Central Coast Regional Board

Meeting with Wouch, CDOG, Shires, EPA
February 8, 1985

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AGENDA

Meeting between WOGA, CDOG, SWRCB, EPA

February 8, 1985 10:30AM

PURPOSE

CONSIDERATION OF ADDITIONAL AGENDA ITEMS

BACKGROUND

POLICY (regarding air scrubbing wastes, water softener regeneration brine, filter backwash)

- Reasoning
- Schedule for Permit Applications
- Suggested Procedure for Enhanced Recovery Wells

DISCUSSION AND RESPONSE TO THE POLICY

CONCLUSIONS

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STATEMENT OF POLICY

Any well which is used for the disposal of any of the following fluids:

- air scrubber wastes
- water softener regeneration brine
- filter backwash

are either Class I, IV, or V wells under the federal UIC program.

Any well which is used for enhanced recovery and through which any of the above fluids are injected will be reviewed on a case by case basis to determine if the inclusion of these fluids is for disposal or for enhanced recovery. If it is determined that the inclusion of these fluids is for the purpose of disposal, the well is classified as a I, IV, or V. If it is determined that the purpose is for enhanced recovery, it is a Class II well.

DEFINITION OF A CLASS II WELL (40 CFR 144.6 [b])

Wells which inject fluids:

(1) Which are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.

(2) For enhanced recovery of oil or natural gas; and

(3) For storage of hydrocarbons which are liquid at standard temperature and pressure.

SCHEDULES FOR EXISTING CLASS I, IV, and V WELLS

Class I - Complete permit applications must be submitted by June 25, 1985. EPA determines whether or not a permit application is complete.

Class IV - Existing wells must be properly plugged and abandoned by December 25, 1984.

Class V - Inventory information must be submitted by June 25, 1985.

Wells injecting waste underground have been classified under the federal Underground Injection Control (UIC) program. The federal UIC program is contained in 40 CFR 146 and became effective July 24, 1980. The program divides wells into five "classes":

Class I: Wells which inject hazardous or nonhazardous wastes below the lowest formation containing, within 1/4 mile, an underground source of drinking water (USDW);

Class II: Wells which inject fluid that has been brought to the surface in connection with oil or gas production, and which may be commingled with nonhazardous waste waters from gas plants which are an integral part of production operations (includes "enhanced recovery" wells for waterflood or steamflood operations);

Class III: Wells which inject fluid for the extraction of minerals;

Class IV: Wells which inject hazardous waste into or above a formation containing, within, 1/4 mile, a USDW (such wells must be banned or the receiving aquifer exempted within six months from commencement of a federally accepted UIC program);

Class V: Any well not in Classes I, II, III, or IV. This category includes dry wells and wells injecting nonhazardous waste into or above a USDW. ground water recharge wells, and salt water intrusion barrier wells.

For the purposes of the federal regulations, an "underground source of drinking water" means an aquifer or its portion that either supplies or could supply a public water system; and that either currently supplies drinking water for human consumption or that contains less than 10,000 mg/l total dissolved solids; and that is not an exempted aquifer. An exempted aquifer is an aquifer, or its portion, that meets the criteria in the definition of a USDW but that has not been exempted pursuant to 40 CFR 122.35(b).